National Weather Service
Western Region
and
University of Utah

Collaborative N-Wave Effort

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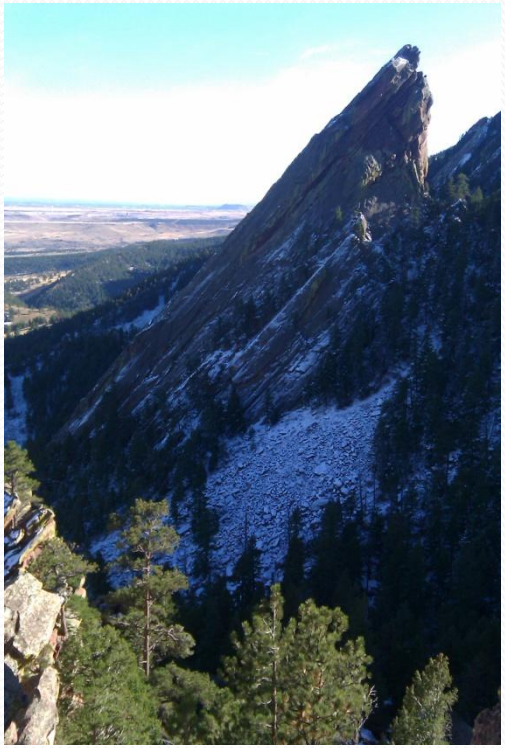
May 11, 2011
Boulder, CO

Agenda



NWS Western Region

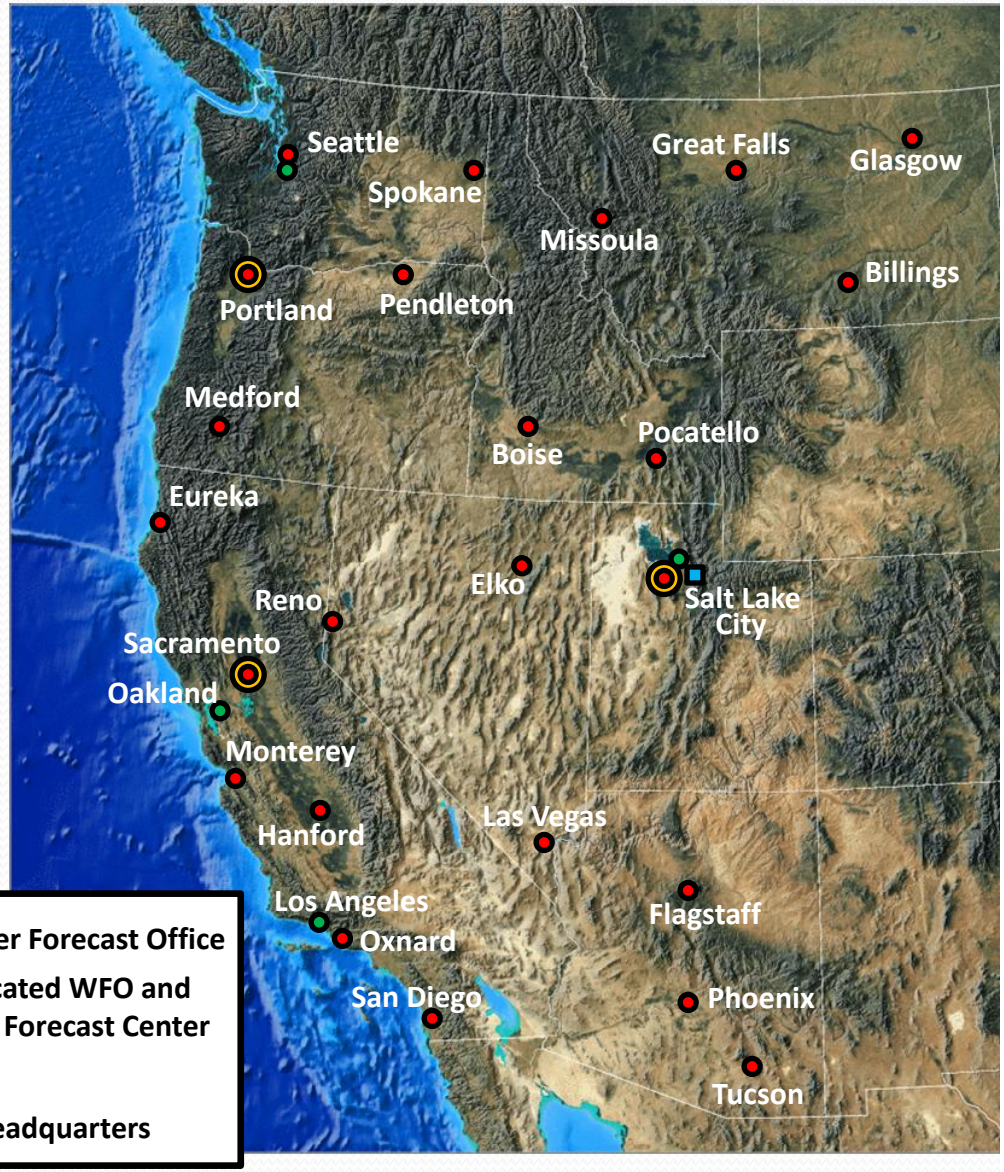
University of Utah

Opportunity for Collaboration

Why is N-Wave important for WR?

Benefits, Plans and Opportunities

National Weather Service - Western Region (WR)



Mission and Focus

- Protection of Life and Property
- Decision Support Services

WR Challenges

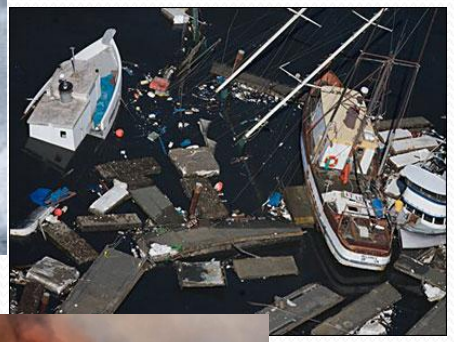
- Wide range of environs
- Sparse RADAR coverage due to mountainous terrain
- *Bandwidth Challenged*

Serving 8 Western States via

24 Forecast Offices
3 River Forecast Centers
4 Central Wx Service Units
708 Employees

Weather Impacts in NWS/WR



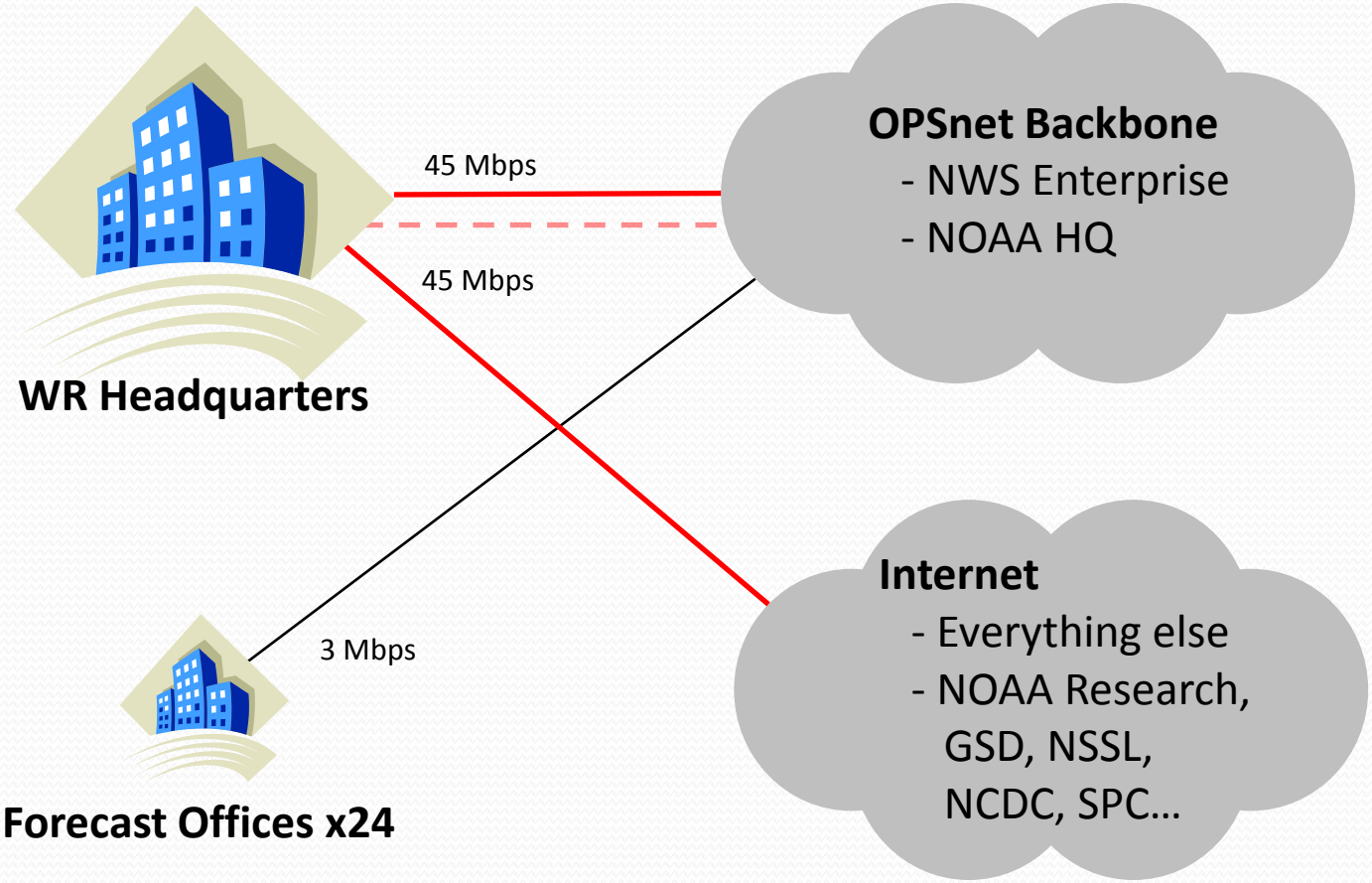






Simplified WR Network

- Sub-optimal paths to NOAA data resources
- Does not scale
- Cost-limited



Joint Proposal to NOAA

- **Partner with Univ. of Utah to attach to NOAA N-Wave network**
  - Fiber infrastructure
  - Gigabit Ethernet to WRH
  - Gigabit Ethernet to SLC/CBRFC

- **Research Partners / Science Drivers**
  - NOAA's ESRL/GSD for ingest of 3km HRRR data, and 30km FIM data
  - NOAA's NSSL for testing of real-time NMQ/Q2 Flash Flood prediction

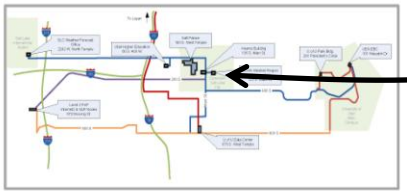
- **Value to NOAA and NWS/WR**
  - Timing and Cost Avoidance
  - WR becomes better connected
  - Empowers NOAA Research to Operations

  - *Applied* Research and Prototyping

Steve Corbató
Director, Cyberinfrastructure,
University Information Technology
Adjunct Faculty, School of Computing
University of Utah

Opportunity for Collaboration

University of Utah
Fiber-Optic Build-out
Salt Lake City



NWS/WRH

INTERNET2®

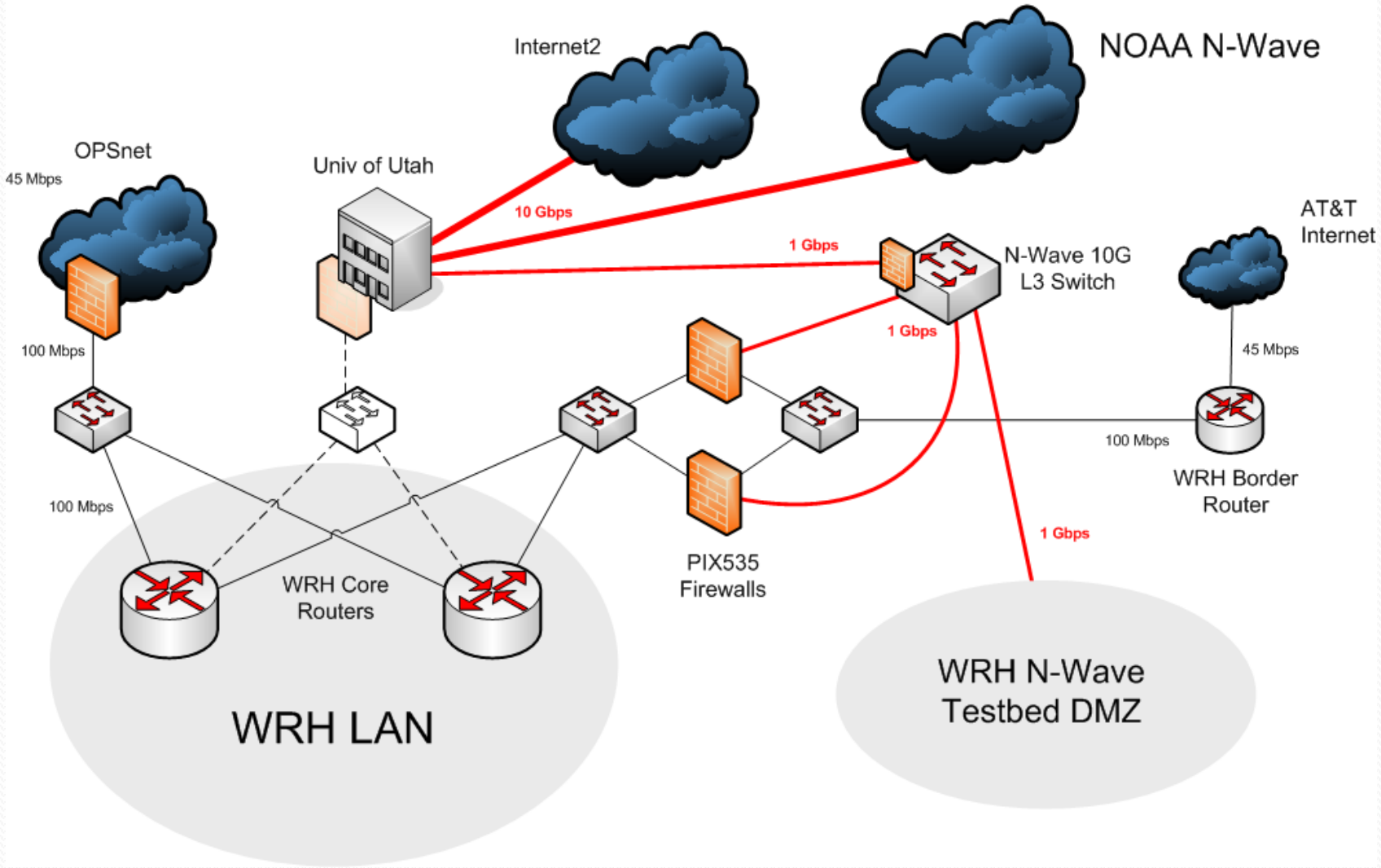
NLR

n-wave
NOAA RESEARCH NETWORK

UTAH EDUCATION NETWORK
WWW.UEN.ORG

Proposed WRH N-Wave Architecture

May 2011

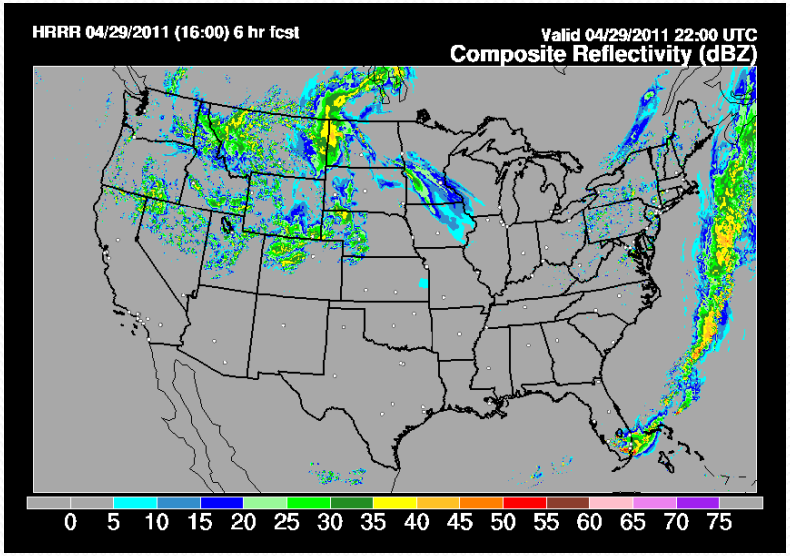


Why is N-Wave important for WR?

- **Strategic Opportunity**
  - Will enable (faster) Technology Transfer from NOAA Research to WR
  - Will provide improved access to: Models, Data Centers, HPC Resources
  - Positions WR for better connectivity to important Regional Networks and key N-Wave agencies:
    ESRL, NSSL, SPC, PMEL, GFDL, NCDC, NCEP
  - Does not replace OPSnet, but supplements Operational connectivity

- **Timing is important**
  - American Recovery and Reinvestment Act funds are available (for now)
  - Opportunity to partner with Univ. of Utah/UEN for fiber build-out (SLC fiber installation summer 2011; UofU Data Center live January 2012)
  - Utah Transit Authority TRAX line expansion

Short-Term Wins



- **The High-Resolution Rapid Refresh (HRRR)**
  The HRRR is a 3-km resolution, hourly updated, cloud-resolving atmospheric model, initialized by DFI-fields from the 13km radar-enhanced Rapid Refresh run at NOAA/ESRL/GSD.

- **HRRR is designed to** provide rapidly updated model guidance on convective storms for
  - Air traffic management
  - Severe weather forecasting
  - NOAA National Weather Service Warn-On Forecast

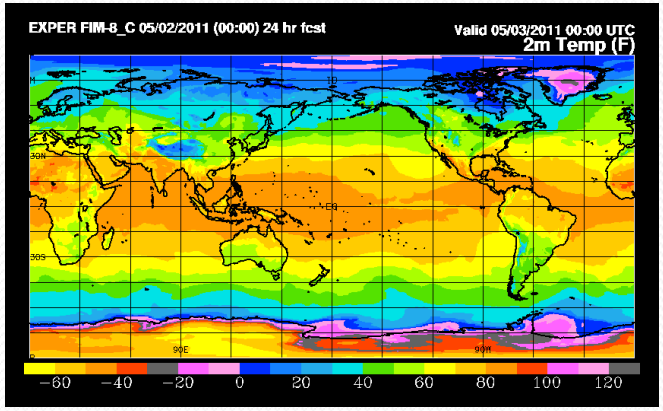
- **Anticipated Benefits to WR**
  - Enable full model downloads to WRH; distribute select fields to region
  - Simulated RADAR important for sparse observations in WR
  - Usage: Flash Flood Guidance (AZ), SuperCell Storms (MT)
  - 15 minute data for FireWx Forecasts, Hazardous Chemical releases

http://ruc.noaa.gov/hrrr/

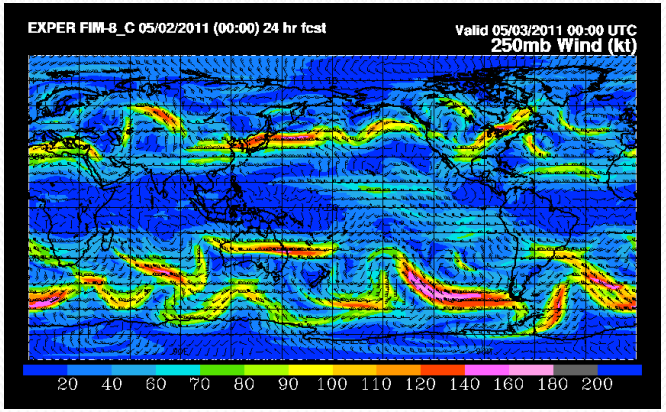
Short-Term Wins

- **The Flow-following/Finite-volume Icosahedral Model (FIM)**

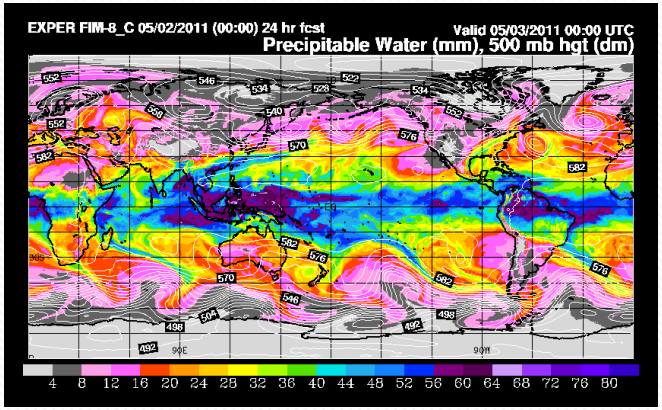
  A new 30 km global weather prediction model currently under development in the Global Systems Division of NOAA/ESRL



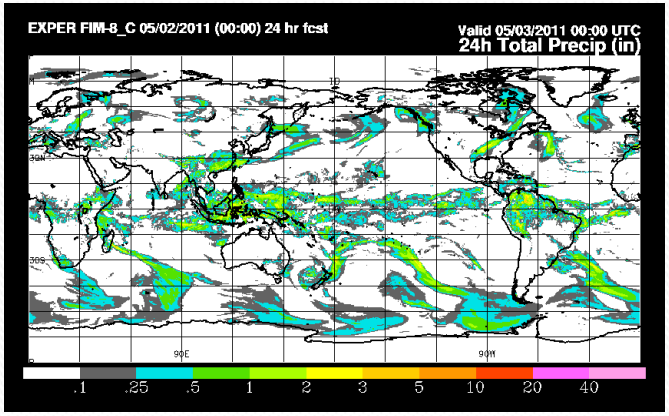
2m Temperature



Wind



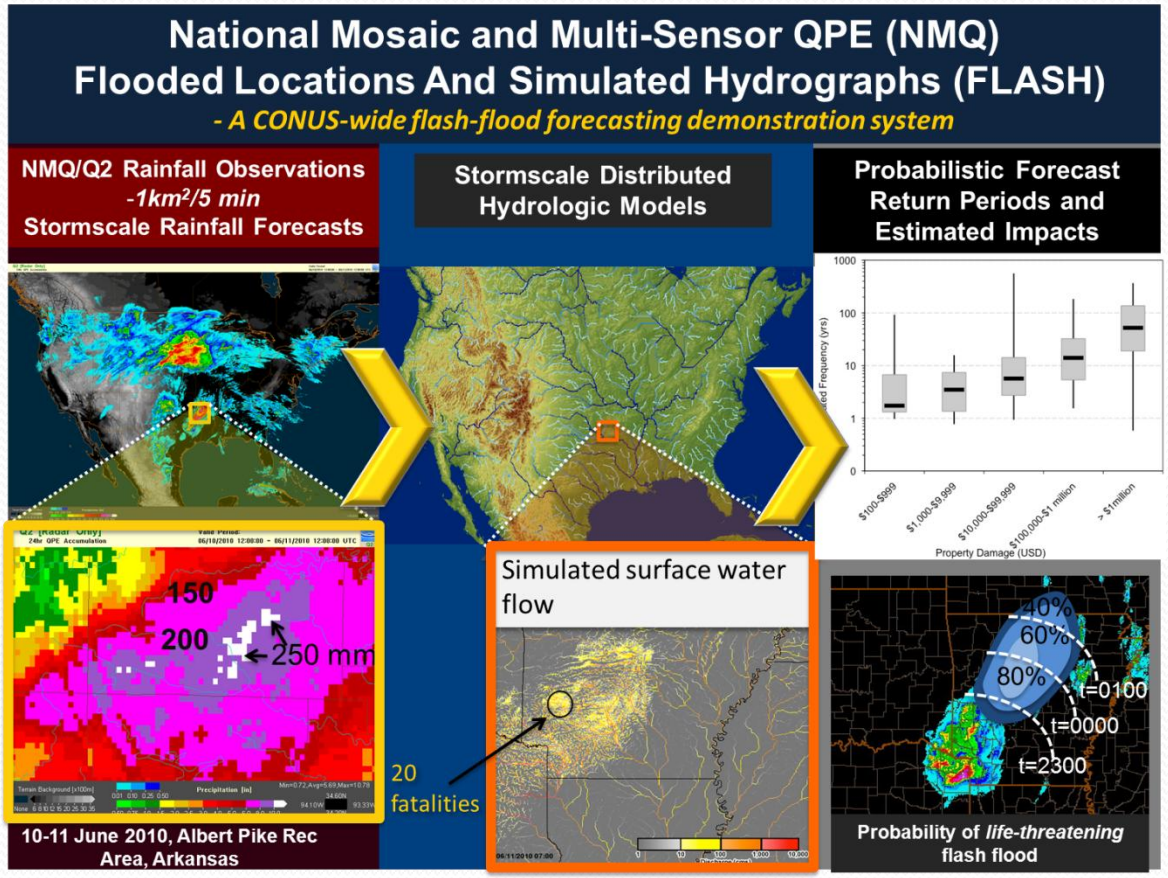
Precipitable Water



Total 5-day Accumulated Precip

http://fim.noaa.gov/

Short-Term Wins



- **NMQ/Q2** continues NSSL's departure from radar-centric precipitation estimation and moves toward a multi-sensor approach focused on high-resolution integration of radar, satellite, model, and surface observations to produce very high-resolution precipitation estimates.

http://nmq.ou.edu/
http://www.nssl.noaa.gov/projects/q2

Mid-Term Plans

- **NextGen** – Position WR to integrate NextGen Air Transportation System
- **Climate** – Partner Regional Climate Director w/GFDL and ORNL researchers
- **Observations** – Investigate feasibility of UDOT streaming video with WFO/SLC

- **Strengthen** – the NWS-Utah R&E meteorological community in support of NWS's focus on providing decision support services

Long-Term Opportunities

> High-speed connectivity to Western Regional Center in Seattle
> Collaborative research with Alaska and Pacific Regions
> Integrate with other federal partnerships, eg NOAA's Integrated Water Resources Science and Services (IWRSS) – USGS and US Army Corps of Eng.

"A man does not plant a tree for himself; he plants it for posterity."
--Alexander Smith,
Scottish poet

Summary

NOAA's N-Wave research network is an opportunity for NWS Western Region to obtain significant benefits in

- applied research and science
- network connectivity to NOAA resources, and
- R&E partnerships

This is a logical extension of N-Wave: to reach two new NOAA sites with unique requirements and capabilities for enhancing NOAA Research to Operations

Collaboration with the University of Utah makes the scalable IT infrastructure possible for establishing N-Wave access in Salt Lake City – that will lead to improvements in the science and service NWS provides to WR communities

Thank you